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REVIEW OF SECTORAL CLUSTERS, SECOND PHASE: LAND, DESERTIFICATION, FORESTS AND BIODIVERSITY

Conservation of biological diversity

Report of the Secretary-General

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INTRODUCTION

1. The present report reviews progress in the implementation of the aims set out in chapter 15 of Agenda 21 1/ (Conservation of biological diversity) since the United Nations Conference on Environment and Development (UNCED) and presents a set of recommendations for action. The report was prepared by the United Nations Environment Programme (UNEP) as task manager for chapter 15 in Agenda 21, in consultation with the United Nations Secretariat, in accordance with arrangements agreed on by the Inter-Agency Committee on Sustainable Development at its fourth session. It reviews the progress achieved since UNCED and highlights the major biodiversity issues that it is considered would benefit from the further considerations, support and guidance of the Commission on Sustainable Development.

2. The conservation of biological diversity, which is addressed principally in chapter 15 of Agenda 21 but also in several other associated chapters, will be considered by the Commission within the cluster "Land, desertification, forests and biodiversity" at the current session. The objectives of chapter 15 are aimed at the conservation of biological diversity, the sustainable use of biological and genetic resources, the fair and equitable sharing of the benefits arising from the use of those resources, and the implementation of the Convention on Biological Diversity, 2/ the objectives of which they specifically reflect. Many of the issues covered in chapter 15 are addressed in other chapters of Agenda 21, as well as in the Convention on Biological Diversity and other international instruments, such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 3/ the Convention on the Conservation of Migratory Species of Wild Animals (CMS), 4/ the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (RAMSAR), 5/ the United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and for Desertification, particularly in Africa (A/49/84/Add.2, annex, appendix II), and the regional seas programmes.

3. In the preparation of the present report, valuable contributions were received from a wide range of United Nations agencies and bodies, including the Department for Policy Coordination and Sustainable Development of the United Nations Secretariat, the Food and Agriculture Organization of the United Nations (FAO), the United Nations Educational, Scientific and Cultural Organization (UNESCO), the United Nations Conference on Trade and Development (UNCTAD), the United Nations Industrial Development Organization (UNIDO), the International Labour Office (ILO), the International Fund for Agricultural Development (IFAD), the World Meteorological Organization (WMO), the International Maritime Organization (IMO), the United Nations Population Fund (UNFPA), the United Nations Children's Fund (UNICEF), the International Telecommunication Union (ITU), the World Bank, the United Nations Environment Programme (UNEP); the regional commissions; regional intergovernmental organizations; and many non-governmental organizations, including The World Conservation Union (IUCN), the World Resources Institute (WRI), the Environmental Liaison Centre International (ELCI), the Consultative Group on International Agricultural Research (CGIAR), the African Centre for Technology Studies (ACTS), the Environmental Defense Fund, Greenpeace, the Third World Network, Birdlife International, and the German Non-Governmental Organizations Forum.

I. GENERAL OVERVIEW

A. Biodiversity and sustainable development

4. Biological diversity - biodiversity for short - refers to the variety and variability of all plants, animals and micro-organisms that exist on earth and the ecological complexes of which they are part as well as the way in which they interact with one another and with their physical surroundings, including ecosystems diversity, species diversity and genetic diversity. In short, biological diversity is the variety of all life and natural processes. Biodiversity is a key provided by nature for opening up sustainable development opportunities. The biological resources of genes, species and ecosystems are essentially renewable resources; if managed effectively, they can create the basis for sustainable development. Conservation of biodiversity is therefore critical for the very survival of humankind. It lies at the heart of the key sustainable development issues, such as food security, human health and sustainable livelihoods. High agricultural and forest productivity and sustainability depend on the vital activities and the genetic diversity of diverse biota composed of an estimated 10 million (range 5-100 million) species of plants, animals and micro-organisms. Wild and domesticated components of biodiversity enable us to meet many of our daily needs for food, shelter, medicines and industrial products. Such basic commodities as wool, leather, cotton, silk, timber, rattan, resins, gums, rubber, meat, potatoes, maize, rice, wheat, bananas, medicinal plants, cocoa, tea and coffee are just a few typical components of biodiversity that are too often taken for granted. Without these raw materials, it would be impossible to sustain such human livelihoods as agriculture, forestry and fisheries, and improvements in pharmaceutical products and health care would be seriously hampered.

5. The underlying motivation for conserving biological diversity and using its components sustainably is thus deeply rooted in concern for the well-being and sustainable development of people. Biodiversity should be perceived not only in terms of conservation and science but also in terms of economics and resources, as a sustainable development issue. Consequently, actions geared to conserving biodiversity must be fully integrated both into overall national plans for sustainable development and into related sectoral plans (e.g., agriculture, forestry, marine, rural development and land use plans).

6. The conservation of biological diversity and the sustainable use of biological resources cut across a wide spectrum of the issues addressed in Agenda 21, including important economic and other human activity, such as promoting sustainable agricultural production and rural development (chap. 14); managing fragile ecosystems (chap. 13); protection of the oceans and the marine environment and the management and sustainable development of coastal areas (chap. 17); protection of freshwater resources (chap. 18); combating deforestation and desertification (chaps. 11 and 12); combating poverty (chap. 3); environmentally sound management of biotechnology (chap. 16); the role of indigenous people and their communities (chap. 26); and changing consumption patterns (chap. 4). Consideration of the issues contained in these chapters can be productive only if biodiversity concerns are taken into account.

7. Chapter 15 of Agenda 21 also cuts across macroeconomic policy issues, such as external indebtedness and the net transfer of resources (chap. 33), which support wasteful consumption patterns (chap. 33), as well as demographic dynamics (chap. 5) and trade and the environment (chap. 2). Activities under chapter 15 and related chapters of Agenda 21, together with measures contained in the Convention on Biological Diversity and other relevant legal instruments and agreements, thus need to be integrated into political, social and economic policy-making at every level. This was envisaged in paragraph 15.5 (b) of Agenda 21 (on the development of national strategies) and further elaborated in chapter 8 (Integrating environment and development in decision-making). The priority needs of developing countries for sustainable economic growth and the eradication of poverty need to be taken fully into account. As users of biological resources, people - especially indigenous people and local communities - need to be recognized as the front-line managers of biodiversity.

8. Given the critical importance of biological and genetic resources for the attainment of sustainable development and for the well-being of humankind, it is worth recalling that the steady erosion of biodiversity is largely the result of human activity. Despite mounting efforts over the past two decades to halt or even reverse this trend, the loss of the world's biodiversity has continued unabated. If a determined and concerted effort is not undertaken immediately to implement the commitments entered into at the United Nations Conference on Environment and Development (UNCED) in a coordinated and coherent manner, not only will the loss of species continue (currently estimated at between 20,000 and 50,000 species per year), but activities in the key socio-economic sectors mentioned above could be seriously undermined by the deterioration or permanent loss of their raw materials.

B. The loss of a valuable asset

9. The value of maintaining biodiversity for sustainable development is gradually being realized, and steps are being taken to conserve habitats, species and genetic resources. The increasing attention this issue has received has also served to underline how little is known about the scope and value of biodiversity on Earth. The lack of knowledge falls into two major areas. In the first place, neither the total number of living species that exist today, nor the number of those that have disappeared during the past few centuries is known. For all the positive good that biodiversity promises for improving the lives of human beings, scientists are not yet in a position to estimate the number of species or organisms on the Earth to an order of magnitude. There is a wide variation among estimates of the total number of species in the world. To date, while only 1.7 million species of plants, animals and micro-organisms have been described world wide, estimates of the total number of species on Earth range from 5 to 100 million or even more, 10 million being a conservative estimate. It is estimated that extinction is currently proceeding at the rate of 30 to 300 species per day, although that is only a crude conjectural assessment; there are few areas of science of such direct relevance to human beings about which so little is known. Agenda 21 made a contribution to redressing this gap in scientific knowledge by calling for the production of regularly updated world reports on biodiversity based upon national assessments in all countries (para. 15.7 (b)). The third session of the Commission on

Sustainable Development should provide a valuable opportunity to review progress made in this important area. In the second place, the true value, especially in economic and resource terms, and the full extent of the current and future potential uses of biodiversity remain unknown.

10. Mainly because biodiversity comprises many components and because of the dearth of scientific and other data, it is extremely difficult to determine the total economic and ecological value of the range of goods and services that biodiversity provides. For these and other reasons, economic systems and policies fail to ascribe a value to biodiversity. This constitutes one of the major causes of biodiversity loss. Assessments of the value of biodiversity are often based on the value of products derived from agricultural crops, fisheries and wild species, and the genetic variation within them (i.e., from biological resources used directly to generate income). For example, agriculture accounted for 32 per cent of the gross domestic product (GDP) of low-income developing countries and 12 per cent of the GDP of middle-income countries in 1989. Trade in agricultural products amounted to US$ 3 trillion, while fisheries contributed 100 million tons of food world wide in the same year.

11. Wild species and the genetic variation within them make contributions to agriculture, medicine and industry worth many billions of dollars per year. So-called "consumptive use values" (from resources that are consumed directly without passing through a market) are often the foundation of community welfare in rural areas. For example, firewood and dung provide over 90 per cent of the total primary energy needs in Nepal, the Republic of Tanzania and Malawi, and exceed 80 per cent in many other countries. One study of four indigenous Amazonian Indian groups found that they used from half to two thirds of all forest trees as food, construction material, raw material for other technology, and medicinal and trade goods (virtually all species were used as firewood or as food for harvested animals). Conventional measures of economic performance, such as gross national product (GNP), have tended to ignore this very extensive use when calculating the annual income of such groups, even though the value of replacing such goods from other sources would be considerable.

12. In Africa, harvested species help feed rural people, especially the poorest villagers living in the most remote areas. In Botswana, over 50 species of wild animals provide animal protein exceeding 90 kilograms per person per year in some areas: over 3 million kilograms of meat are obtained yearly from springhare (Pedetes capensis) alone. In Ghana, about 75 per cent of the population depends largely on traditional sources of protein supply, mainly wildlife, including fish, caterpillars and snails. In Nigeria, game constitutes about 20 per cent of the mean annual consumption of animal protein by people in rural areas (including 100,000 tonnes of the two giant rat species (genus Thrynomys) known as "grasscutters"). In Zaire, 75 per cent of the animal protein consumed comes from wild sources.

13. The term "productive use value" is assigned to products that are harvested commercially for exchange in formal markets and is therefore often the only value of biological resources reflected in national income accounts. Productive use of such biological products as fuelwood, timber, fish, animal skins, musk, ivory, medicinal plants, honey, beeswax, fibres, gums, resins, rattans,

construction materials, ornamentals, animals sold as game meat, fodder, mushrooms, fruits and dyes, can have a major impact on national economies.

14. Such values can be remarkably high. It has been estimated that 40 per cent of the world market economy is based upon biological products and processes. Some 4.5 per cent of GDP in the United States of America is attributable to the harvesting of wild species, estimated to have amounted to some US$ 87 billion per year between 1976 and 1980. The percentage contribution of wild species and ecosystems to the economies of developing countries is usually far greater than it is for industrialized countries. Timber from wild forests, for example, is the second leading foreign-exchange earner for Indonesia (after petroleum) and throughout the humid tropics, Governments have based their economies on the harvest of wild trees: total exports of wood products from Asia, Africa and South America averaged US$ 8.1 billion per year between 1981 and 1983.

15. While market prices represented by productive use value can be an important indicator of value, they are not always an accurate representation of the true economic value of the resource and do not deal effectively with the questions of distribution and equity. It is also apparent that consumers may value resources differently: when they are admiring scenic beauty, they value tropical forests in a different way from when they are consuming timber products. The methodology for defining and relating these different valuations is still being developed.

16. In addition, species without consumptive or productive use may nevertheless play an important role in ecosystems, supporting species that do have such uses. In Sabah, Malaysia, for example, recent studies suggest that high densities of wild birds in commercial Albizia plantations limit the abundance of caterpillars that would otherwise defoliate the trees: the birds require natural forest for nesting.

17. All species form part of an ecosystem. Ecosystems in turn provide services of considerable value to humans. These services are often regarded as "public goods" that benefit the entire community or the whole world but are seldom evaluated in economic terms.

18. Moreover, as has been demonstrated in Nepal, while such benefits may be enjoyed within the country itself, many benefits from conservation are realized outside the country's borders in forms as diverse as reduced flooding because of the protection of upland forests, the supply of medicinal plants and genetic material, or the pleasure given to international tourists. For these reasons, the costs of conserving biological diversity need to be shared internationally. The current evidence of the impact of human activities on natural ecosystems suggests that far greater investments are required in order to maintain the continued productivity of these ecosystem services.

19. Information is gradually accumulating on the economic benefits derived from using genetic diversity to improve crop production by conventional breeding, and on the use of plant-derived drugs.

20. In Asia, by the mid-1970s, improvements using genetics had increased wheat production by US$ 2 billion and rice production by US$ 1.5 billion per year,

through the incorporation of dwarfism into both crops. A "useless" wild wheat plant from Turkey was used to ensure disease resistance to commercial wheat varieties worth US$ 50 million annually to the United Sates of America alone. One gene from a single Ethiopian barley plant now protects California's US$ 160 million annual barley crop from yellow dwarf virus. Major cultivars of crops improved by wild genes have a combined farm sales import value of US$ 6 billion a year in the United States of America. An ancient wild relative of corn from Mexico - a perennial that is resistant to seven major corn diseases and can grow at high elevations in marginal soils - can be crossed with modern annual corn varieties, with potential savings to farmers estimated at US$ 4.4 billion annually world wide.

21. Of all the useful plant-derived drugs, only 10 are synthesized in the laboratory: the rest are still extracted from plants. Traditional medicine forms the basis of the primary care for about 80 per cent of the 3 billion inhabitants of the developing countries. The retail value of plant-derived drugs was estimated at US$ 43 billion in 1985 in the industrialized countries and it is estimated that markets for herbal drugs in those countries could reach US$ 47 billion by the year 2000. In 1960, a child suffering from leukaemia had only one chance in five of survival; today, that child has four chances in five, due to treatment with drugs containing active substances discovered in the rosy periwinkle (Catharanthus roseus), a tropical forest plant originating from Madagascar. Commercial sales of drugs from this plant now total around US$ 100 million a year world wide. With advances in plant biotechnology and the availability of new and precise screening tools, current interest in plants as a source of raw materials for developing new medicinal products is expanding.

22. Many natural ecosystems provide benefits that are indirect and have economic value through services rather than products. Most such benefits will fall into one or another of the following categories: (a) the photosynthetic fixation of solar energy, which transfers solar energy through green plants into natural food chains, thereby providing the support system for species that are harvested; (b) ecosystem functions involving reproduction, such as pollination, gene flow and cross-fertilization, the maintenance of environmental forces and species that influence the acquisition of useful genetic traits in economic species, and the maintenance of evolutionary processes, leading to constant dynamic tension among competitors in ecosystems; (c) maintaining water cycles, including recharging groundwater, protecting watersheds and buffering extreme water conditions, such as flood and drought; (d) the regulation of climate conditions, both macro-climatic and micro-climatic, including influences on temperature, precipitation and air turbulence; (e) the production of soil and the protection of soil from erosion, including the protection of coastlines from erosion by the sea; (f) the storage and cycling of essential nutrients, such as carbon, nitrogen and oxygen, and the maintenance of the oxygen-carbon dioxide balance; (g) the absorption and breakdown of pollutants, including the decomposition of organic wastes, pesticides, and air and water pollutants; and (h) the provision of the recreational/aesthetic, sociocultural, scientific, educational, spiritual and historical values of natural environments.

23. Biodiversity also has certain sociocultural values: many plants and animals have sociocultural and religious attributes that bestow a special status

on them. Some plant parts are used as symbols of peace or war or to attain protective charms, giving them special religious importance.

24. The study of the physical or biological nature of plants and animals has led to the accumulation of useful, basic, scientific knowledge, which has in turn laid the foundation for further advancement and to further discoveries.

C. The United Nations Conference on Environment and Development: a new challenge to conservation and the sustainable use of biodiversity

25. The objectives and activities contained in chapter 15 of Agenda 21 represent, therefore, a formidable challenge to Governments and relevant United Nations bodies, major groups and non-governmental organizations, among others, to improve the conservation of biological diversity and promote the sustainable use of biological resources, as well as to support the Convention on Biological Diversity and other relevant agreements in a coordinated and integrated manner.

26. Prior to UNCED, a number of entities within the United Nations system and among the non-governmental organizations were directly involved in issues related to the conservation of biodiversity and the sustainable use of biological resources; these organizations have cooperated in a series of related programmes and activities to address the loss of biodiversity. The work of the United Nations system and the non-governmental organizations was explicitly recognized by UNCED, which directed that Agenda 21 should take full account of and build upon the work already being carried out on biodiversity.

27. Most of these programmes and activities have continued since UNCED and provide inputs to the implementation of chapter 15 and related chapters of Agenda 21, together with the Convention on Biological Diversity and related agreements and action plans. The main thrust of the effort called for in chapter 15 is focused upon activities at the national level, supported, as appropriate, by entities within the United Nations system and other bodies. Thus, within the United Nations system, much work has been undertaken to assist countries, especially developing countries, with the planning and management of biodiversity. Entities within the United Nations system and non-governmental organizations are also collaborating to strengthen national capacities for undertaking biodiversity programmes. Among the activities and programmes under way are the preparation of national biodiversity studies, strategies and action plans.

28. The Convention on Biological Diversity and other related agreements will be the principal instruments for undertaking the conservation of biodiversity and the sustainable use of biological and genetic resources. In paragraph 15.7 (e) of Agenda 21, the international community is called upon to promote cooperation between the parties to relevant international conventions and action plans with the aim of strengthening and coordinating efforts to conserve biological diversity and the sustainable use of biological resources. The unprecedented rate of ratification of the Convention and its entry into force on 29 December 1993, which was rapidly succeeded by the first meeting of the Conference of Parties (Bahamas, 28 November-9 December 1994), have already

served to demonstrate the commitment of the international community to the goals of the conservation and sustainable use of biological diversity and the fair and equitable sharing of any benefits arising from that use.

29. UNCED provided the impetus for countries to start taking the necessary steps for incorporating biodiversity issues into their development policies, processes and plans. However, since then few Governments have incorporated biodiversity concerns in their development and action plans and much still remains to be done to make the protection of biodiversity a reality.

30. A number of major initiatives have been taken to implement the Convention on Biological Diversity and Agenda 21, including the preparation of biodiversity country studies, strategies, and action plans, a global biodiversity assessment report, strengthening developing countries' capacities in biodiversity data management, the establishment of the Elephant and Rhinoceros Conservation Facility, the preparation of country action plans for the conservation of the African elephant and the African and Asian rhinoceros in key range States, and the establishment of the Global Tiger Forum (UNEP); the release of the Global Biodiversity Strategy (IUCN, WRI and UNEP); Global Marine Biological Diversity Strategy (the Centre for Marine Resources, IUCN, WRI and UNEP); Global Biodiversity: Status of the Earth's Living Resources (WCMC, UNEP, IUCN, WWF and WRI); the World Watch List for Domestic Animal Diversity (UNEP and FAO); the launch of the Programme Diversitas (UNESCO, IUBS and SCOPE); global biodiversity forums (IUCN, WRI and UNEP) and regional workshops on the Convention on Biological Diversity (UNEP); the creation of the System-wide Programme on Genetic Resources (SGRP) (FAO); the harmonization of the International Undertaking on Plant Genetic Resources (FAO); the convening of an international forum on the theme "Biodiversity, science and development: towards a new partnership" (IUBS and UNESCO); the preparation of the International Conference on Biosphere Reserves (UNESCO); and the establishment of the Global Environment Facility (GEF) to support, among others, national, regional and global biodiversity-related activities (World Bank, UNDP and UNEP).

II. REVIEW OF PROGRESS ACHIEVED: MAIN POLICY ISSUES AND EXPERIENCES

31. The assessment of progress achieved since UNCED in implementing chapter 15 of Agenda 21 (Conservation of biological diversity) reveals that most United Nations system activities relevant to chapter 15 are concentrated in the areas of management-related activities, human resources development, capacity-building, data and information, and international and regional cooperation. There is little or no evidence of major initiatives being undertaken on technology transfer or finance, issues that call for multi-agency responses. Some of the activities specified in chapter 15 also require large amounts of capital investment to achieve their objectives. Due to financial constraints and other reasons, most agencies appear to be continuing with their established work programme priorities although a special focus is being placed on biodiversity.

32. At the time of preparing the present report, information on country experiences was not yet available.

A. Experiences of major groups and non-governmental organizations

1. Indigenous and rural communities

33. In the aftermath of UNCED, the contribution of indigenous and rural communities to the conservation and sustainable use of biodiversity and as innovators has been recognized but not necessarily fully understood. Indigenous peoples are to be found in diverse areas, including forests, all over the world.

34. The result of the innovative activity of farmers lies in their fields. For example, the Mende farmers of Sierra Leone, independent of foreign experts, conduct field trials, test new seeds against different soil types and compare results. In the Horn of Africa, Ethiopian farmers maintain variety performance records, sometimes inscribed on door posts. Farmers normally breed for specific micro-environments, but it is often the case that their local varieties can perform remarkably well in roughly similar environments in other parts of the world. Research institutes report the use of an Ethiopian farmer variety in Burkina Faso and a South African variety in Ethiopia. Rural societies maintain agricultural biodiversity because it is essential to their survival. They breed their own improved varieties for the same reason. For them, there is no useful distinction between conservation and development.

35. Minimizing risk is an important part of the livelihood strategies of rural communities. West Africa's Azande farmers actually increase both the number and the complexity of their crop experiments following poor harvests. Faced with striga weed infestation in their millet, farmers in Niger have sought out advice from other Sahelian communities with longer experience and have developed strategies to trap striga by inter-planting sesame. Formal sector researchers are now looking for and finding genuine inventiveness in rural communities, ranging from cassava cultivators in the Dominican Republic to potato growers in the Andes and rice farmers in the Philippines.

36. However, the cultivated fields and the domesticated crops and animals are just one part of the story. In fact, evidence is mounting that virtually all of the biodiversity within the reach of rural communities, be it in field or forest, has been nurtured or developed by community conservers and innovators. What are often called wild species are often an integrated part of farming systems and can be considered to form part of the intellectual achievements and contributions of rural societies. The Chacoba of Bolivia, for example, make use of almost four fifths of the woody species in their surrounding forests. The Ka'apor of Brazil use three quarters of their tree diversity, while in Venezuela the Panere use about half their documented diversity. All of them use between one fifth and one half of all woody species for food and up to one third for medicinal purposes.

37. The importance of so-called wild species to the food supply of rural communities is brought home by the Mende of Sierra Leone, who draw less than one fifth of their nutrition from cultivated species and more than half from forests, streams and fallow fields; the remainder comes from local markets and plantation crops. In the Bungoma District of western Kenya, almost half of all families incorporate wild species in their home gardens and only a marginally

lower percentage of families collect them for food in the forest. Because local communities rely on foods collected throughout their environment, distinctions between the biodiversity in agricultural and natural ecosystems are blurred. The maintenance of diversity in all ecosystems is important to meet the twin goals of conservation and livelihood security.

38. Despite their importance for livelihood security, these crops of local importance, farmer-developed varieties and wild foods are largely ignored by conventional agricultural and forestry research and development, which focuses attention on only a limited number of domesticated crops of global importance. Policy makers should ensure that new agricultural technologies and changing patterns of land use and land tenure do not reduce the availability of wild food resources or eliminate the use of local crops and varieties. On the contrary, appropriate policy incentives are needed to support the conservation and sustainable use of this important part of agricultural biodiversity.

2. Women

39. It is increasingly recognized that the empowerment of women is an essential component of sustainability; it is less well recognized that women have a special role in relation to the protection of biological diversity.

40. Women play a major part in the protection of biological diversity through their many roles and responsibilities. In the South, women act as resource managers. Women tend the fields and grow the food that feeds their families; in fact, women grow most of the food in Africa. They gather the firewood and raise the alarm when the forest dwindles. In the case of the Chipko movement in India, for example, the threat of deforestation was enough to rally the local women to civil disobedience to protect the ecosystem. They knew how closely their well-being was tied to that of the forest. They knew that the forest provided more than timber, that its dead limbs provided the heat to cook their meals, that the living biomass of the forest provided pure water and that the roots of the trees held the soil along the hillsides.

41. Sudanese farmer-breeders are usually women. Kayapo women in the Brazilian Amazon not only breed new crop varieties but also preserve representative samples in hillside genebanks. Tanimuka and Yukuma women in the Colombian Amazon have bred and preserved numerous clones of peach palm with spineless trunks and unusually large and seedless fruits. During the 1984 famine in the southern Sudan, Toposa women risked their own lives to hide the seeds for the next year's planting.

42. Other women around the world have also recognized the need, to not only protect biodiversity but also restore it. The Green Belt Movement in Kenya, involving over 80,000 women to date, maintains more than 1,000 nurseries where not just mono-cultural plantations but a variety of trees are planted to provide for human and non-human needs.

43. In many societies, women have led the resistance to the non-sustainable exploitation of resources. Penan women and children have spent weeks on logging blockades in Sarawak attempting to protect what is left of the world's oldest

rainforests on the island of Borneo, where unsustainable logging has resulted in appallingly high rates of species extinction.

44. In the industrialized countries, women frequently head organizations and community movements for the protection of wilderness and biodiversity, and they also play a significant role as consumers. Millions of women (and men) in such countries are keenly aware of the need to reduce consumption and learn to live with consumption levels that do not stress the Earth's carrying capacity or deny large segments of humanity access to sufficient resources to meet their rudimentary needs. Some far-sighted corporations capitalize on and encourage the power of the consumer when they promote rainforest products in cosmetics and shampoos, thus assisting in maintaining biological diversity.

45. Consumer choice to avoid non-sustainably harvested products, whether from Canada's temperate rainforests or the Brazilian Amazon, changes the economic realities of doing business. But women in industrialized countries are not uniformly wealthy consumers; indigenous women in those countries often have a subsistence livelihood in which they are close to the land and its biodiversity. A. G'wichin, woman and founder member of the Yukon legislature, has dedicated herself to the protection of the land, particularly through opposition to the proposal from the previous United States Administration to open up the porcupine caribou calving grounds on the United States side of the border to oil and gas development. Meanwhile, Cree women of Canoe Lake in Saskatchewan spent months on Canada's longes running a blockade against clear-cut logging. And Innu women from Labrador have toured Canada seeking support for their struggle to stop low-level military flights over their territory, which threaten the world's largest remaining caribou herd and several endangered species.

46. It is critical that the role of women as resource managers, community activists, consumers and environmental advocates be recognized when strategies for the protection of biological diversity are being developed. Women should participate at the local, regional, national and international levels as plans are made to meet commitments under Agenda 21 and the Convention on Biological Diversity. As resource managers, women should be consulted and supported in what they are already doing to protect biological diversity. Protecting biological diversity should not be seen as something separate and apart from other human development priorities. It may just be that the role of women in protecting biodiversity will provide a bridge between environment and development on the path to sustainability.

3. Non-governmental organizations

47. Non-governmental organizations participated actively in the UNCED process; the negotiation of the Convention on Biological Diversity and the United Nations Framework Convention on Climate Change; the FAO Commission on Plant Genetic Resources; and the ninth session of the Conference on the Parties to CITES. Their role, together with the entities within the United Nations system, was critical in raising the awareness of the need to conserve biological diversity and make sustainable use of biological resources. The meetings, workshops and other forums organized by the non-governmental organizations provide platforms for a better understanding of the issues and the linkages between biodiversity

and other sectoral and cross-sectoral issues of Agenda 21. They emphasize the role of indigenous people and their communities in biodiversity planning and management. On the basis of available information, the main activities of some major groups are summarized below.

48. The World Conservation Union (IUCN), in collaboration with WRI and UNEP, supports the organization of global biodiversity forums as an international mechanism for continuing dialogue and debate among people working in resource management, research, education, industry as well as policy makers, non-governmental organizations and community members residing near or within biodiversity important areas, concerning their options for action to save, study and make sustainable and equitable use of biodiversity.

49. The IUCN programme on biodiversity at the global, regional and national levels was organized under five major themes: (a) integrating biodiversity into national planning process; (b) providing advisory services and facilitating support on biodiversity issues to the Global Environment Facility (GEF), the World Bank, the regional development banks and UNEP, as well as national Governments; (c) developing policies on biodiversity; (d) supporting international programmes on biodiversity; and (e) supporting biodiversity components of other IUCN programmes. The increasing demands on the programme have far outweighed staff resources but IUCN was still able to secure a sound financial basis for 1993-1995 and began recruiting additional professional staff. Major achievements include the organization of global biodiversity forums, in collaboration with WRI and UNEP; an active outreach programme, including numerous publications and presentations; a significant contribution to the promotion of the implementation of the Convention on Biological Diversity at all levels; and a substantive review of the pilot phase of GEF.

50. The African Centre for Technology studies (ACTS) has been engaged in various policy research activities on biodiversity and related biotechnology, including (a) the organization of the first international conference on the Convention on Biological Diversity, on the theme "National interests and international imperatives"; (b) embarking on the analysis of the technological capabilities and institutional abilities of selected African countries for biodiversity management and biotechnology research and development; and (c) the exploration of institutional avenues and policy options for promoting the participation and enhancing the capabilities of local communities in the implementation of the Convention on Biological Diversity.

51. The Consultative Group on International Agricultural Research (CGIAR) continued to carry out research in partnership with national, regional and international genetic resources programmes as a means of strengthening the scientific basis for its work encompassing in situ and ex situ conservation and the sustainable use of plant, livestock and aquatic genetic resources. Capacity-building in national programmes and training were other key components of CGIAR activities.

52. Since 1975, CGIAR centres in collaboration with national institutions and United Nations bodies, such as FAO, UNEP, UNDP and the World Bank, have collectively assembled one of the world's largest ex situ collections of plant genetic resources: over 500,000 individual entries, held in the genebanks of

11 centres. In addition, the CGIAR system has helped to conserve 140 plant species in the genebanks of 450 non-CGIAR institutions in over 90 countries. All of the genetic resource collections conserved at CGIAR centres are held in trust for the benefit of humankind and for the use of the scientific community world wide. The CGIAR genebanks provide raw materials for plant breeders, farmers and other users. Collectively, they distribute more than 600,000 samples of germplasm from the in-trust collections and breeding programmes each year to individuals and institutes in 120 countries. Agreements between the CGIAR centres and FAO to place the in-trust collections under the auspices of FAO were concluded in October 1994.

53. CGIAR has been carefully examining the role of its centres, particularly in light of Agenda 21 and the Convention on Biological Diversity, and in May 1994 CGIAR decided to establish the System-wide Genetic Resources Programme (SGRP), recognizing that integrating the current activities of many centres would greatly enhance transparency and accountability, as well as the impact of the CGIAR in its international efforts. SGRP thus comprises the independently managed genetic resources units and programmes of the individual centres, with IPGRI as the lead centre.

54. Through research, working in partnership with other organizations at the local, national and international levels, CGIAR also seeks to develop improved technologies, strategies and policies for both the in situ and ex situ conservation of plants and animals that are useful or potentially useful for agriculture, forestry and fisheries.

55. The World Resources Institute (WRI), in collaboration with ACTS and INBio (Costa Rica), has published a policy research report on the new and rapidly evolving legal and institutional mechanisms for regulating the exploration of wild plant, animal and microbial substances. The report offers guidelines to nations who need to develop domestic policies and legislation to regulate access and provide incentives for the exploration of biodiversity for potential uses. WRI is also collaborating with UNEP on the preparation of guidelines for the preparation of national biodiversity strategies and action plans with the aim of streamlining the various development and environmental plans and incorporating biodiversity goals and activities into sectoral and cross-sectoral plans.

56. The World Conservation Monitoring Centre (WCMC), a joint IUCN/WWF/UNEP venture, continued to compile and manage substantial global databases on threatened animals and plants, and published the 1993 United Nations List of National Parks and Protected Areas, Global Biodiversity: Status of the Earth's Living Resources, and the Biodiversity Map Library. WCMC, in collaboration with UNEP, provided technical support to many countries in the area of biodiversity information-gathering, dissemination and management.

B. Matters related to finance and technology

57. In paragraph 15.8 of Agenda 21, the UNCED secretariat estimated that the average total annual cost (1993-2000) of implementing the activities of chapter 15 was about $3.5 billion, including about $1.75 billion from the international community on grant or concessional terms. These are only

indicative figures and estimates of order of magnitude; actual costs depend on the specific strategies and programmes adopted by countries. Financing biodiversity-related activities is a central issue for the Convention on Biological Diversity and especially for GEF, which continues to mobilize financial resources for biodiversity activities.

58. Additional financial resources have been provided by GEF (US$ 303.5 million, excluding co-financing by the United States Agency for International Development (USAID)) for the purpose of the conservation and sustainable use of biological diversity. Various donors provided approximately US$ 3 million as additional resources to assist developing countries in the implementation of CITES, supporting mainly the capacity-building component, species surveys and management strategies.

59. The question of estimating the gap between financial requirements and available resources for financing activities relevant to chapter 15 of Agenda 21 is being addressed by the biodiversity country studies (UNEP). Issues related to the amount of financial resources needed for implementation of the Convention on Biological Diversity, as well as issues related to eligibility criteria and the institutional structure required to operate the financial mechanism created under the Convention were considered by the Conference of the Parties at its first meeting (Nassau, the Bahamas, 28 November-9 December 1994). The interim secretariat of the Convention prepared a useful paper on methodologies for estimating the funding needs of multilateral biodiversity assistance between 1993 and 2000, as well as a paper on incremental costs. The lack of transparency in financial mechanisms and the excessive amount of time needed to access them are causes for concern.

60. Many United Nations bodies and non-governmental organizations have reviewed their programmes in relation to Agenda 21 and the Convention on Biological Diversity and have increased their financial support for relevant activities at the national, regional and global levels. The precise total figure of additional resources has not been estimated. Resources currently available, however, do not come anywhere near meeting current biodiversity conservation needs. If biodiversity concerns are to be adequately met, a radical change of view will be required among key decision makers. Biodiversity needs to be seen as a political priority not only in terms of its conservation but also for the potentially valuable contribution it can make to the improvement of peoples' lives, especially in developing countries.

61. Apart from GEF, the financial mechanisms that are in place and that are being utilized by Governments and institutions for biodiversity activities continue to encompass traditional sources of funding, namely:

(a) National government budgets, incorporating locally sourced funds that face fierce competition from other developmental priorities;

(b) Official development assistance (ODA) obtained by Governments through bilateral/multilateral agreements;

(c) Non-governmental organizations funding arrangements, sometimes with (but often without) the due involvement of national Governments or the participation of local counterpart non-governmental organizations;

(d) Private sector investments, incorporating varying degrees of investments by foreign-based transnational corporations (TNCs) involved in bio-prospecting.

62. Based on General Assembly resolution 44/228 and the commitments entered into at UNCED, developing countries had great expectations concerning financial transfers from North to South through ODAs, international NGOs and TNCs; the level of actual transfers, however, has been far less than was expected.

63. In Agenda 21 and the Convention on Biological Diversity, a clear link was recognized between the supply of genetic resources, on the one hand, and access to and the transfer of technologies that help characterize, evaluate, conserve and make use of those resources, on the other. This implies the need for the development of creative partnerships among nations and between the public and private sectors, by means of which nations and institutions can establish collaborative ventures for technology transfer; technology can then be acquired and adapted through conventional programmes, such as training, information exchange and access to patent information.

64. The application of environmental policies and/or economic instruments to stimulate the development, transfer and dissemination of appropriate technologies in support of the conservation of biological diversity and the sustainable use of biological resources featured prominently during the negotiation of the Convention on Biological Diversity. An indicative list of transferable technologies and know-how related to the implementation of the Convention (see UNEP/CBD/IC/2/11) 6/ was prepared by the Open-ended Intergovernmental Meeting of Scientific Experts on Biological Diversity for the Subsidiary Body on the Scientific, Technical and Technological Advice (SBSTTA), and a description of appropriate models for access to and the transfer of technology is expected to feature in the medium-term plan of the Conference of the Parties. The Meeting also prepared four papers to provide a basis for developing appropriate models of mechanisms for access to and transfer of the relevant technologies on the following topics: (a) ways and means of promoting the development and/or transfer of innovative, efficient and state-of-the-art technologies relevant to the conservation and sustainable use of biological diversity; (b) ways and means of integrating into modern management the practices of indigenous and local communities that embody traditional lifestyles; (c) scientific and technical programmes for training in conservation and the sustainable use of biological diversity at the regional, national and local levels; and (d) technologies and know-how for data collection, management and transfer. The Intergovernmental Committee on the Convention on Biological Diversity (ICCBD), at its second meeting in June 1994, made recommendations that may facilitate the establishment of a clearing-house mechanism for technical and scientific cooperation within the Convention.

65. Each country should assess its technological capability, determine its needs and decide on how much to invest in technology transfer, including biotechnology development, as well as how to integrate technology development

into national development strategies. The relevance of each technology to the conservation and sustainable use of biodiversity should be carefully assessed in technology transfer arrangements. Special attention should be paid to the likely socio-economic impacts of such technologies, and to the need to duly recognize, reward, document and develop the knowledge, innovations and practices of indigenous people and local communities, and integrate them into modern management practices.

66. The protection conferred by intellectual property rights in general and by patents in particular is considered to be an effective means of promoting technology, development and transfer for which adequate human and financial resources are essential. However, while legislation on intellectual property rights is well developed or in place in many developed countries and is under consideration in a few developing countries and some of the economies in transition, there are no international legal instruments or standards that adequately recognize the rights of indigenous and local communities and farmers over their knowledge, technologies and innovations.

C. Recent developments and experiences in international cooperation

1. Intergovernmental processes

(a) Convention on Biological Diversity

67. The Convention on Biological Diversity entered into force on 29 December 1993 and is in the process of being effectively implemented. By 18 December 1994, 167 States and the European Community had signed and 107 States had ratified the Convention, which assured the widest possible representation of countries in the first meeting of the Conference of the Parties. UNEP, in collaboration with UNESCO and FAO, continued to provide scientific and technical support to the secretariat of the Convention and to facilitate intergovernmental consultations through the meetings of ICCBD and the first meeting of the Conference of the Parties.

68. The first meeting of the Conference of the Parties (Nassau, the Bahamas, 28 November-9 December 1994) provided, inter alia, an opportunity to outline a programme of work for advancing the objectives and provisions of the Convention, as well as to set the stage and establish the mechanisms needed for its implementation. The decisions adopted by the Conference are described below.

Rules of procedure for meetings of the Conference of the Parties

69. The Conference of the Parties adopted its rules of procedure, with the exception of paragraph 1 of rule 40, which deals with voting procedures on matters of substance.

Financial resources and mechanisms

70. The Conference adopted policy, strategy and programme priorities, as well as eligibility criteria for access to and utilization of financial resources,

and a list of developed country Parties and other Parties that voluntarily assume the obligations of contributing financial resources to the Convention Trust Fund. Programme priorities are mainly based on national priorities, including capacity-building to facilitate the preparation and implementation of national strategies, plans and programmes. The Conference also decided that the restructured GEF should continue to serve as the institutional structure for operating the financial mechanism under the Convention on an interim basis, and that the restructured GEF should be instructed to take prompt measures to support programme priorities and eligibility criteria for access to and utilization of financial resources as the Conference had defined them. The Conference also adopted the financial rules for the administration of the Convention Trust Fund and the 1995 budget of US$ 4.8 million to fund activities under the secretariat of the Convention.

Clearing-house mechanisms for technical and scientific cooperation

71. The Conference of the Parties requested the secretariat of the Convention to prepare a comprehensive study containing concrete costed recommendations to assist the Conference of the Parties in the establishment of the clearing-house mechanism.

Selection of a competent international organization to carry out the functions of the secretariat of the Convention on Biological Diversity

72. The Conference of the Parties selected UNEP to carry out the functions of the secretariat of the Convention.

Subsidiary Body on Scientific, Technical and Technological Advice

73. The Conference decided that the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) should operate in accordance with the terms of reference contained in article 25, paragraphs 1 and 2 of the Convention until the Conference could further elaborate them. SBSTTA was requested to prepare a proposal for its medium-term programme of work based on the priorities set in the programme of work of the Conference of the Parties and on article 25 of the Convention, and to develop/establish its modus operandi at its first meeting (to be held at UNESCO headquarters in Paris, 4-8 September 1995). SBSTTA was requested, in particular, to consider the following matters, on which it was requested to advise the Conference of the Parties at its second meeting:

(a) Alternative ways and means for the Conference of the Parties to start the process of considering the components of biological diversity, particularly those under threat, and for identifying action that could be taken under the Convention;

(b) Ways and means of promoting and facilitating access to technology, as well as its transfer and development;

(c) Scientific and technical information for inclusion in national reports on measures taken to implement the provisions of the Convention and the effectiveness of such measures in meeting the objectives of the Convention;

(d) Scientific, technical and technological aspects of the conservation and sustainable use of coastal and marine biological diversity.

Preparation of the participation of the Convention on Biological Diversity in the third session of the Commission on Sustainable Development

74. The Conference of the Parties requested its President to transmit a statement on its behalf to the high-level segment of the third session of the Commission on Sustainable Development. In the statement, the Conference noted that the Convention on Biological Diversity was the primary international legal instrument for advancing the conservation and sustainable use of biological diversity and the fair and equitable sharing of benefits arising out of the use of genetic resources. The Conference noted the importance that it attached to the development of a substantive relationship with the Commission on Sustainable Development given its responsibility in respect of Agenda 21 and the complementarity of its mandate with that of the Conference of the Parties. The Conference appealed to the Commission to make all efforts in its own right to advance the concerns of the Convention. In addition to addressing particular sectoral issues on the agenda of the Commission at its third session, the Conference stressed that biological diversity was a cross-cutting issue that was relevant to virtually all Commission concerns. The statement also noted the decisions taken by the Conference of the Parties at its first meeting, as well as its medium-term programme of work.

Medium-term programme of work of the Conference of the Parties 1995-1997

75. The Conference also adopted its medium-term programme of work (1995-1997), which provided a systematic, year-by-year approach to routine items, as well as new thematic matters that the Conference wished to deal with in the future. Standing items included, inter alia, the conservation of threatened components of biological diversity and items related to access to genetic resources, technology transfer and handling biotechnology. The Conference took into account the deep concern and interest of the Parties about the need for the safe transfer, handling and use of all living modified organisms resulting from biotechnology so as to avoid any adverse effects on the conservation and sustainable use of biological diversity. It decided to establish an open-ended ad hoc group of experts to consider without undue delay the need for and modalities of a protocol, containing appropriate procedures to be followed in the field of the safe transfer, handling and use of any living modified organism resulting from biotechnology that might have an adverse effect on the conservation and sustainable use of biological diversity.

Location of the secretariat of the Convention on Biological Diversity

76. The Conference of the Parties agreed to postpone a decision on the location of the secretariat of the Convention to the second meeting; the Conference outlined some of the details Governments might wish to include in their offers to host the secretariat.

International Day for Biological Diversity

77. The Conference of the Parties recommended to the General Assembly that it adopt 29 December, the date of entry into force of the Convention on Biological Diversity, as International Day for Biological Diversity; the General Assembly accordingly adopted that Day at its forty-ninth session.

(b) Convention on International Trade in Endangered Species of Wild Fauna and Flora

78. At the ninth meeting of the Conference of the Parties of CITES (Fort Lauderdale, Florida, 7-18 November 1994), 118 of the 124 Parties to the Convention were present. During the meeting, a strategic plan stressing the priorities that should be implemented during the next three years was adopted, as well as listing criteria for including species in the specific appendices to the Convention. By consensus, Governments requested the secretariat of the Convention to make sure that a close cooperation with the interim secretariat of the Convention on Biological Diversity was developed, since the linkages between the two conventions were of major importance to the successful achievement of sustainable development. It was also stressed that CITES should strengthen its cooperation with other trade agreements, such as the General Agreement on Tariffs and Trade (GATT), the International Tropical Timber Organization (ITTO), the International Wheat Council (IWC), and the International Commission for the Conservation of Atlantic Tunas (ICCAT). The important role played by non-governmental organizations in recent years in the implementation of CITES was also noted. The budget and work plan were approved, and Governments placed great emphasis on the need for GEF partners to recognize CITES as an important area for financing through the biodiversity portfolio.

(c) Climate change and desertification conventions

79. Recognition of the world as truly one major interconnected ecosystem has increased appreciation that actions in one area affect human well-being and ecosystem health elsewhere. Deforestation and fossil-fuel burning, for example, contribute to climate change through global warming. Ecological effects on biological diversity due to climate change and desertification will amplify the impacts that are already being imposed on natural ecosystems by humans. Many species, such as migratory species, species dependent on the timing of ice-melting, Arctic communities, marine, coastal and peripheral populations, genetically impoverished species, mountain and alpine communities, and species that inhabit dry lands, semi-arid and arid ecosystems, are all likely to be adversely affected by global warming; the climatic changes predicted may bring about catastrophic losses in genetic resources and species and ecosystem diversity.

80. The loss of biological diversity is particularly important in dry lands, where natural habitat and native vegetation are often the sole livelihood of farmers and pastoralists. The degradation of dry lands poses a threat to biological diversity and the carrying capacities of those lands. Some of the most important crops originated in dry lands, such as wheat, barley, sorghum, millet, many pulses and cotton, as well as animals that have become closely linked to the development of human civilization, such as the horse, the sheep,

the goat, the cow, the camel and the lama. Moreover, close to 1 billion people inhabit dry lands. When a dry-land species adapted to dry conditions is lost, it is very likely that it is lost for ever; because species and genes well adapted to drier areas are so rare, such loss is immeasurable.

81. The implications of the loss of biodiversity at all the above-mentioned levels are serious and ominous; such loss has consequences both for the species that is threatened or made extinct and for the habitats that are degraded and become desertified and unable to function properly. Global warming could indeed play havoc with the world's living organisms, affecting humanity itself. Many species that inhabit islands, floodplains or coastal areas, including some human populations, may not be able to redistribute themselves fast enough to keep up with the projected climatic changes. Many of the islands could well be completely submerged, with complete loss of their flora and fauna. Both the United Nations Framework Convention on Climate Change and the United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa have direct intimate linkages to the Convention on Biological Diversity; mechanisms for cooperation between and among them should therefore be established.

(d) International undertaking on plant genetic resources

82. The FAO Commission on Plant Genetic Resources (PGR), at its fifth session (April 1993), recognized that the Convention on Biological Diversity, once operative, would play a central role in determining policy on PGR in the future. If the Convention decided to adopt a protocol on PGR, the Commission would play a major role in developing such a protocol, in full cooperation with the Conference of the Parties of the Convention. The Commission stated that such a protocol might be served by its own governing body, secretariat and financial mechanism.

83. At its extraordinary session (7-11 November 1994), the Commission initiated the revision of the Undertaking on Plant Genetic Resources, in particular the consolidation of its text and annexes in harmony with the Convention, and the inclusion of issues relevant to access to plant genetic resources for food and agriculture and the implementation of farmers' rights. In that regard, the Commission noted that negotiations would be in the hands of Governments and that revision of the Undertaking should be carried out carefully. Throughout the process, communication should be maintained between the Commission and the Convention and subsequently the Conference of the Parties of the Convention. At a later stage, the Conference of Parties might consider the desirability of transferring the revised undertaking into a protocol. The revision process would be an integral part of the preparatory process of the International Technical Conference on the Conservation and Utilization of Plant Genetic Resources (to be held in Leipzig, Germany in 1996). It is intended to conclude the negotiations of the revised Undertaking in early 1996.

2. United Nations system

84. Since UNCED, much work has been done by organizations and bodies of the United Nations system in support of Agenda 21 and the Biodiversity Convention (see annex for details).

III. CONCLUSIONS AND PROPOSALS FOR ACTION

A. Conclusions

85. As noted, the direction taken by relevant entities within the United Nations system in the area of biodiversity has focused upon activities at the national level, supplemented as appropriate by regional programmes and international activities. The Convention on Biological Diversity and other related agreements will continue to be the principal instruments for undertaking and ensuring the effective conservation and sustainable use of biological and genetic resources, and the fair and equitable distribution of its benefits. The Commission on Sustainable Development should respond to the constructive statement from the Conference of the Parties to the Convention by encouraging further development of the links established with the Convention and by lending support to the Convention as the lead entity in coordinating existing relevant agreements at the global and regional levels. In this regard, particular attention should be paid to the requirements contained in paragraph 15.7 (f) of Agenda 21, as well as to the management-related activities indicated in paragraphs 15.5 (c), (d) and (e), which would underpin the successful formulation and implementation of the national strategies, plans or programmes called for in article 6 of the Convention.

86. Since UNCED, there appear to have been no major initiatives on the issues of technology transfer and financial mechanism(s) that would ensure or guarantee the new and additional financial resources required by developing countries. These are issues that require urgent intergovernmental and multi-agency responses.

87. The active participation of non-governmental organizations in the UNCED process, as well as in the negotiation process for the conventions on biological diversity and climate change, was critical in raising public awareness on crucial issues and linkages among the respective conventions, other related agreements, and various sectoral and cross-sectoral issues of Agenda 21. Their critical role should continue to be recognized and their participation should be more fully supported, especially at the national and regional levels.

88. In addition, some of the issues that still need to be addressed include (a) the harmonization of principles and obligations at the global, regional and national levels; (b) implementation of methods and procedures for better understanding and identification of the various components of biodiversity, through the regular update of fauna and flora inventories, and the conservation and management of indigenous species (domesticated and cultivated); (c) the mobilization and exchange of information relevant to conservation and the sustainable use of biodiversity; (d) the coordinated promotion of public awareness at the local, national and international levels; and (e) the

determination of the potential impact of intended projects and programmes on the delicate balance and well-being of fragile and complex ecosystems world wide. Assessment of social dimensions and human impacts is a prerequisite for the successful sustainable use and conservation of biodiversity.

89. Significant progress, however, has been made on most of the issues pertaining to the Convention on Biological Diversity, and a solid foundation was laid for the work of the Conference of the Parties, at its first meeting in the Bahamas, towards the effective participation of the Convention at the current session of the Commission on Sustainable Development.

B. Proposals for action

90. Based on the information provided above, it is clear that for chapter 15 of Agenda 21 to be fully and effectively implemented, work will need to be undertaken on various issues of cooperation and coordination, joint programming and delivery mechanisms, information exchange and policy reforms, as described below.

1. Cooperation programmes and collaborative arrangements

91. Governments need to develop mechanisms for appropriate coordination among biodiversity action plans and the multitude of other action plans and strategies called for by various treaties and international institutions, as well as the monitoring of their implementation and reporting on progress made. Within their national biodiversity strategies and action plans, where these exist, countries should identify priorities for regional and international action.

92. Governments in cooperation with the United Nations system, intergovernmental and non-governmental organizations, and in full partnership with indigenous peoples and their communities and other local communities, taking into consideration their role in the conservation, management and sustainable use of biodiversity, need to examine the impact of existing land-tenure systems on biodiversity conservation, and to develop, adopt and strengthen relevant national arrangements for supporting the best possible land-tenure systems that facilitate the active involvement and participation of local communities in biodiversity conservation activities.

93. Biodiversity should be treated as a cross-sectoral issue. The Commission on Sustainable Development may wish to examine ways to ensure that a concerted effort is made to develop common strategies for coordinating the implementation of chapter 15 of Agenda 21 with other relevant portions of Agenda 21 and the Convention on Biological Diversity (e.g., by identifying policy issues, respective areas of competence, future action required and monitoring and evaluating progress).

94. Governments, in cooperation with governmental and non-governmental organizations, need to develop elements and mechanisms for species-specific and ecosystem/area-specific strategies, including scientific research into the

conservation and sustainable use of biodiversity, and also need to facilitate access to relevant technologies.

95. Further efforts should be made by entities within the United Nations system to collect and update information on their financing needs for the implementation of Agenda 21 activities in the area of conserving biodiversity.

2. Information exchange and networking

96. Governments, entities within the United Nations system, and intergovernmental and non-governmental organizations need to collect, analyse and disseminate more reliable and adequate data, and to develop monitoring mechanisms for measuring achievements made at the national, regional and global levels. Attempts should be made to remedy the acute shortage of information available in developing countries on the status of their national biodiversity, a deficiency that impedes the development of monitoring and sound management; in-country networks and national reports based on biodiversity country studies could be useful mechanisms in this regard. To that end, networking among those concerned should be promoted, with common strategies and joint programming and implementation of activities.

3. Education, science, human resources development, technology transfer and capacity-building

97. The requisite scientific, technical and managerial capacities for implementing national biodiversity strategies, plans or programmes in response to Agenda 21 have still not been developed, even though the political commitment was made at UNCED to financially support biodiversity activities. Developed countries and relevant international organizations need to establish effective mechanisms for improving both the human and institutional capacities of developing countries, through joint programming for capacity-building at the national and regional levels. Particular attention is drawn to paragraph 15.11 of Agenda 21, which calls for existing institutions to be strengthened and for new ones responsible for the conservation of biological diversity to be established, and for consideration to be given to the development of mechanisms such as national biodiversity institutes or centres.

98. The international scientific community, in cooperation with Governments, entities within the United Nations system, and intergovernmental and non-governmental organizations, need to make efforts to develop economic tools for determining the costs and benefits of the conservation of biodiversity and sustainable use of biological resources, and their distribution at the local, national, regional and global levels.

4. Policy reforms

99. Governments need to undertake activities aimed at the restructuring and reforming of national policies, the development of incentive measures and the revision of existing and/or the development of new legislation to realize the

objectives of Agenda 21 and the Convention on Biological Diversity. Efforts should be made by the entities of the United Nations system, among others, to assist Governments in this regard. To that end, entities within the United Nations system should adjust their programmes and activities in line with Agenda 21 and the Convention on Biological Diversity, and should develop joint collaborative programmes and projects to promote the integrated development, sustainable use and conservation of biological diversity.

100. Governments, in cooperation with relevant entities within the United Nations system and the Convention on Biological Diversity, should initiate studies and discussions on the impact of intellectual property regimes related to genetic material on the conservation and sustainable use of biological resources, and on how a fair and equitable sharing of those resources and the benefits that they generate may be achieved and how to develop an adequate system of intellectual property rights for protecting the collective knowledge and innovations of indigenous peoples and their communities as a major social group in biodiversity management, taking into account, inter alia any contribution from the Conference of the Parties to the Convention.

5. Additional proposals for action

101. The United Nations system should develop and strengthen a joint approach to assess the positive and negative impacts of macroeconomic and other global issues that affect biodiversity, such as debt, consumption and production patterns, land-tenure systems, population, multilateral financing, the world trade system and its condition, and economic instruments.

102. Governments should assess existing information systems, including networks, with the aim of establishing communication links among regions for the better exchange of data and the dissemination and management of existing information through, inter alia, electronic mail and the use of remote sensing, so as to facilitate the survey and monitoring of biodiversity.

103. While the biodiversity information base is far from complete and much remains to be learned about biodiversity, there is now adequate scientific basis to begin the formulation and implementation of biodiversity programmes in most countries. Efforts should be made by Governments and the United Nations system, among others, to make full use of existing knowledge and to further improve and increase understanding of the role of biodiversity in sustainable development. Once completed, the global biodiversity assessment of knowledge should yield a useful baseline against which gaps in knowledge could be identified and addressed.

104. The Commission on Sustainable Development may wish to:

(a) Call upon multilateral organizations and intergovernmental and non-governmental organizations to cooperate with Governments in developing a coordinating mechanism to ensure the effective implementation of existing conventions and agreements on biological diversity and the rational use of limited resources;

(b) Examine ways and means of ensuring that concerted efforts are made to develop common and coherent strategies for the implementation of chapter 15 and related chapters of Agenda 21;

(c) Respond positively to the statement of the Conference of Parties to the Convention on Biological Diversity at its first meeting, with reference to, inter alia, cooperating actively with the Convention, urging widespread ratification of the Convention, encouraging Governments to improve the coordination among their various ministries/departments of chapter 15 and other chapters of Agenda 21, notably chapters 10 to 14, and encouraging the Convention to take the lead, with the support and cooperation of other relevant multilateral, intergovernmental and non-governmental organizations, in coordinating existing relevant agreements at the global and regional levels for the effective implementation of resources;

(d) Encourage a joint approach by the United Nations system in assessing the positive as well as the negative impacts of macroeconomic and other issues related to biodiversity.

Notes

1/ United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992, vol. I, Resolutions Adopted by the Conference (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex II.

2/ See United Nations Environment Programme, Convention on Biological Diversity (Environmental Law and Institutions Programme Activity Centre), June 1992.

3/ United Nations, Treaty Series, vol. 993, No. 14537, p. 243.

4/ Selected Multilateral Treaties in the Field of the Environment (Nairobi, United Nations Environment Programme, 1982), vol. I, p. 500.

5/ United Nations, Treaty Series, vol. 996, No. 14583, p. 245.

6/ The indicative list is quite extensive and covers (a) technologies and know-how relevant to the identification, characterization and monitoring of ecosystems, species and genetic resources, (b) technologies appropriate for the in situ and ex situ conservation of components of biological diversity and (c) technologies for the sustainable use of biological diversity.

Annex

UNITED NATIONS SYSTEM ACTIVITIES IN SUPPORT OF CHAPTER 15 OF AGENDA 21 AND THE CONVENTION ON BIOLOGICAL DIVERSITY

1. Management-related activities

1. FAO major programmes on agriculture, fisheries and forestry have a number of objectives and activities that support the conservation and sustainable use of biodiversity by (a) fostering international cooperation and the promotion of national action for the conservation and sustainable use of plant and animal genetic resources, with an emphasis on building national capacity for conservation, evaluation and utilization of these resources for breeding work and related biotechnologies; (b) assessing and developing further the potential of new or underutilized species for agriculture, forestry and fisheries; and (c) encouraging the diversification of production systems and the multiple use of agricultural products and by-products, as an integral part of the maintenance of diversity in rural areas. The main priorities of the programme on natural resources address issues relating to knowledge, the utilization and conservation of biological resources and diversity, the assessment of standing vegetation and its present and potential contribution to agricultural productivity, and the establishment of sustainable farming systems. The programme on crops aims at promoting national capabilities to conserve, enhance and utilize plant genetic diversity through collection, characterization, documentation and the exchange of germ plasm; plant breeding and variety evaluation; plant propagation; international collaboration and information exchange; the development and adoption of modern plant biotechnology in the conservation and improvement of germ plasm; and the promotion of cooperation among interested institutions and laboratories.

2. The FAO Commission on Plant Genetic Resources will harmonize the global system on plant genetic resources with the Convention on Biological Diversity and will work on issues relating to the access to existing germ plasm collections and farmers' rights. The Commission supports international and regional networks on in situ conservation areas; ex situ base collection under the auspices of FAO; the organization of a fourth international technical conference on the conservation and utilization of plant genetic resources; and the establishment of the new global information systems for plant genetic resources and seed exchange based on the ongoing Seed Information System.

3. In the area of livestock genetic resources, FAO in collaboration with UNEP supports the establishment of a comprehensive animal genetic resources programme and the preparation of an updated worldwatch list of domestic animal diversity.

4. The FAO Fisheries Programme supports the conservation and sustainable utilization of biological diversity in high seas, the Exclusive Economic Zones (EEZs), coastal zone ecosystems and inland water courses and wetlands, with the aim of promoting sustainability in world-wide fisheries and the restoration of world resources to levels consistent with the major recommendations of the United Nations Convention on the Law of the Sea and relevant UNCED decisions; strengthening the national capabilities of developing countries for managing

their fisheries, conserving their aquatic ecosystems and preventing the degradation of their aquatic environments; developing an international code of conduct for responsible fishing, taking into consideration all relevant issues, especially those relating to biological, environmental and technological matters; and promoting the integration of the fishery sector into coastal area management.

5. The FAO programme on forestry, in collaboration with UNEP and other organizations, supports the in situ conservation of forest genetic resources and of natural ecosystems by assessing the state of forest resources and contributing to the sustainable management of wildlife, national parks or other protected areas, with the aim of promoting the sustainable management of forest and tree resources and enhancing their sustained utilization on an environmentally sound basis, while maximizing their contribution to socio-economic development; the conservation of forest ecosystems; and the integration of forests and trees into land-use systems so as to sustain the productivity of land and water resources and the stability of the environment.

6. The main activities of UNESCO involved the conservation and sustainable use of terrestrial and aquatic biodiversity centres around the international network of biosphere reserves (324 reserves in 83 countries, covering more than 211 million hectares, in which research and monitoring activities are conducted and the participation of local communities is systematically promoted); the UNESCO MAB programme; the World Heritage Convention (more than 100 natural sites at present, most of which are inscribed on the World Heritage List for their high biodiversity value); the Coastal Marine Research Programme (focusing on the functioning and sustainable use of coastal marine ecosystems and of their biodiversity); the UNESCO/IUBS/SCOPE Programme Diversitas (focusing on the ecosystems function of biodiversity, specifications and extinctions, and the distributions and dynamics of biodiversity); the WWF/UNESCO Programme on People and Plants (focusing on ethno-botany and the sustainable use of indigenous plants); and the microbiological resources centres (MIRCENs) network. The international network of biosphere reserves, the UNESCO programme on coastal and marine research and the MIRCENs network provide important tools for research and monitoring activities related to biological diversity. Scientific and technical training and capacity-building are fundamental elements of various UNESCO programmes. Under the UNEP/UNESCO International Environmental Education Programme, formal secondary and university-level education, including the subject of biodiversity, is supported. Other initiatives for the conservation of biodiversity include studies on property rights related to access to genetic resources and studies on ecological economics; the creation of a format for species information; the sponsoring of a biodiversity forum for decision makers and scientists; training and technical assistance; and the publication and wide distribution of numerous publications for awareness-building.

7. UNEP works to protect and make sustainable use of individual species and their genetic resources; to conserve the habitats where they can continue to evolve and respond to a changing environment; and to develop appropriate ways of maintaining the maximum genetic diversity for improving agriculture, forestry, health, industry and environment, with a special emphasis on species with an established socio-economic value. UNEP addresses biodiversity conservation and

sustainable use at various levels: the ecosystems/biogeographic realms level (forests, arid zones, oceans, freshwater etc.); the species level (wildlife); genetic resources level (plant, animal and microbial resources, and natural resources economics); the processes level (biotechnology); the monitoring and assessment level; and the legal level. In collaboration with sister United Nations agencies, UNEP activities on biodiversity focus on the promotion of effective implementation of Agenda 21, the Convention on Biological Diversity and other relevant international conventions; strategies and action plans through technical and scientific back-stopping; the organization of expert meetings; the preparation of reports to respond to specific issues; the provision of secretariats/interim secretariats to biodiversity-related conventions for assisting in developing or strengthening national legislation to implement the conventions; the preparation of regular global biodiversity status reports as a basis for priority action in respect of the potential policy implications of biodiversity conservation and utilization, including resource management options and socio-economic implications; assisting Governments in preparing national biodiversity country studies, strategies and action plans to reinforce the biodiversity assessment and planning processes, in identifying national priorities for action and in providing a baseline for monitoring the effectiveness of action; and, through CITES, assisting Governments in determining the status of endangered species, supporting the preparation of management plans and establishing export quotas for species transferred from appendix I to appendix II of the Convention.

8. UNEP, jointly with IUCN and WRI, released the Global Biodiversity Strategy, which attempts to stimulate and implement action locally, nationally and internationally consistent with the principles, strategic elements and broad agenda for action contained in Agenda 21, the Convention on Biological Diversity and the "Caring for the Earth". The Global Marine Biological Diversity Strategy was also launched jointly with the Centre for Marine Conservation, IUCN and WWF to focus on the threats to life in the sea and ways to save and use it sustainably.

9. Through its various programmes, UNEP supports a wide range of activities aiming at promoting in situ and ex situ conservation of plant, animal and microbial genetic resources and their use for the development of agriculture, forestry and industry, and the development of related global and regional gene banks and information systems; conserving and managing habitats, ecosystems and wildlife in selected representative areas of the world's biogeographic provinces; strengthening and expanding the global network of gene banks housing the world base collections of crop genetic resources (coordinated by IPGRI), the global programme on livestock genetic resources (coordinated by FAO), the LAC and African biodiversity networks, the Biodiversity Information Network (BIN21) the microbiological resources centres (MIRCENs), the international Microbial Strain Data Network (MSDN), the World Data Center on Micro-organisms (WDC) and the global Information Resource on the Release of Organisms into the Environment (IRRO); expanding and improving related professional and institutional capabilities for the assessment and sustainable management of biodiversity, through pilot projects and appropriate training programmes in the conservation of biological diversity and the sustainable use of biological resources and the application of relevant technologies, and through training in the economics of biological resources and environmental law and policy.

UNIDO supports programmes on the industrial utilization of medicinal and aromatic plants, taking into consideration biodiversity conservation concerns. Through its technology advisory services, UNIDO fosters the cooperation among Governments, local communities and the private sector on biodiversity prospecting. The UNIDO ICGEB provides advanced research and training in the area of biotechnology, including the development of innovative tools and technologies for biodiversity conservation and for the sustainable use of genetic resources, and it promotes the application of environmentally sound biotechnologies. In collaboration with UNEP and FAO, UNIDO supports the establishment of regional and global networks on biodiversity and biotechnology to facilitate access to and exchange of information among countries, and to strengthen the development of databases on biodiversity in developing countries.

11. Current and future work of the World Bank in support of the conservation of biological diversity within the framework of the Convention on Biological Diversity and Agenda 21 include: assisting Governments in the preparation and implementation of national environmental action plans, taking into consideration biodiversity concerns, and in the formulation of conservation and development projects; supporting research centres, universities and grass-roots organizations in biodiversity identification and monitoring; strengthening the participation of local communities in the formulation, implementation and monitoring and evaluation of in situ conservation projects, integrating sustainable use practices into Bank loans; supporting research and training programmes on sustainable management systems and interregional research cooperation; strengthening existing mechanisms for information exchange; and promoting the development of traditional and indigenous technologies.

12. IFAD target groups consist of small farmers, indigenous peoples, nomadic pastoralists, artisanal fishermen and other groups who live in the last remaining areas of high biodiversity and are increasingly recognized as key actors in its management. In collaboration with its partners, IFAD is increasingly financing a new generation of projects in developing countries to address the interface between poverty and biodiversity management, with the aim of alleviating poverty, increasing food production and improving nutrition, while conserving biodiversity. In its poverty alleviation projects, IFAD seeks to address such issues as the displacement or loss of land races and wild crop relatives important to small farmers; the optimal use of minor food and medicinal plants; the management of biodiversity by local peoples to ensure that they benefit from its protection; and research and training into specific agro-systems, traditional crops, biological pest control and the socio-economic and technological aspects of sustainable agriculture, particularly in marginal and resource-poor areas that have not been reached by the green revolution.

13. IMO is carrying out an analysis of the implications of Agenda 21 (including chapter 15, "Conservation of biological diversity") for the IMO. Maritime traffic was recognized to have an impact upon marine biodiversity. The IMO work on pollution prevention, the identification of "special areas", particularly "sensitive sea areas" of unique or unusual ecological significance to be avoided by shipping, ships' routing schemes and on ballast water discharges, is expected to make an important contribution to biodiversity conservation.

14. UNCTAD activities on biodiversity are related mainly to the implementation of the Convention on Biological Diversity. The main objective is to contribute to the design and implementation of economic policies and measures ensuring that developing countries attain economic benefits from the full use of the Convention. The main activities centre around its programmes on natural resources management and its impact on the conservation and sustainable use of biological diversity (to ensure that commodity production and trade are consistent with and promote environmentally sound management of natural resources and the conservation and sustainable use of biological diversity); capturing and expanding economic benefits, including through international trade, through the conservation and sustainable use of biological diversity (to assist developing countries in capturing the full value of their biodiversity through the expansion of the production and exports of goods based on natural resources whose production does not induce biodiversity losses); the internalization of costs and resource values linked to biodiversity (to ensure that biological resources are adequately valued); and the access and transfer of technologies related to the conservation and sustainable use of biological diversity.

15. ECA provides advisory services and support to its member States on agriculture and rural development policies, planning and programming, with a focus on measures for the conservation of natural forests and their biodiversity, desertification and the related conservation of biodiversity, the rehabilitation of degraded ecosystems and green belts in targeted countries, and the strengthening of regional cooperation programmes for the optimum and sustainable use of inland and marine fisheries. Within the framework of the African Ministerial Conference on the Environment (AMCEN), ECA supports biodiversity-related activities.

16. A joint ESCWA/FAO study on wildlife protection and development, involving seven ESCWA countries, is being carried out for presentation at the Ministerial Conference on the theme "Management and sustainable development of dry land in the Arab World". Future ESCWA activities will place emphasis on surveying biological resources in the region, developing methodologies for the conservation of biological resources suited to the ecological systems in the region and promoting the formulation of national biodiversity policies and strategies and the improvement of relevant legislation and enforcement measures. However, ESCWA and its member countries require substantive financial resources to implement biodiversity-related activities.

17. A major result of the ECE species conservation programme was its adoption in 1991 of the European Red List of Globally Threatened Animals and Plants. As a follow-up, the senior advisers to ECE Governments on environmental and water problems adopted in 1992 the Code of Practice for the Conservation of Threatened Animals and Plants and other Species of International Significance, which provides comprehensive guidelines to Governments for maintaining biological diversity within their jurisdiction and promoting the conservation of flora and fauna in their habitats.

18. Currently, ECE activities on biological diversity are related to the implementation of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Helsinki, 1992). The Convention contains

specific obligations to prevent, control and reduce transboundary impact, including adverse effects on flora and fauna. As a first step, guidelines on the ecosystem approach in water management were adopted in 1993.

19. The Joint FAO/ECE Working Party on Relations between Agriculture and the Environment currently examines various aspects and national practices related to biological diversity and landscape protection as part of its work-plan element entitled Economic, legal, technological and regulatory measures for the promotion of environmentally sustainable agriculture and production of healthy food". A revised synthesis study on this subject was considered in October 1994 with a view to preparing draft recommendations for submission to the ECE Committee on Agriculture and the FAO European Commission on Agriculture.

2. Data and information

20. Decision-making for the protection of biological diversity should be based on adequate and precise biological, socio-economic and environmental data that can be obtained and made available through identification, monitoring and the exchange of information. A current and reliable description of the status of biodiversity and of the processes and activities that have or are likely to have adverse impacts on biodiversity is fundamental to good management and sustainable development. Therefore, the establishment of in-country information networks or other information exchange mechanisms is a necessary component of a country's biodiversity protection. In order to ensure that such information is comparable and transferable, uniform information standards and monitoring methodologies should be established.

21. Up-to-date quantitative and qualitative data gathering and analysis in a systematic and comprehensive manner will underpin all types of activities for biodiversity conservation. Decisions about which ecosystems, species, strains or populations should be conserved should be based on objective criteria, since the blanket conservation of the totality of biological diversity is neither economically feasible nor technically possible. For most countries, this will require the development of analytic tools for enumerating, describing and assessing the status of, trends in, and distribution of their biological diversity; identifying the threats to that diversity; assessing current capacities; collecting socio-economic data useful for evaluating the costs and benefits of conserving and sustainably using those resources; and identifying gaps in knowledge and potential conflicts.

22. Compiling, determining and collating such data will necessitate the development of standard data-collection and harmonized processing methodologies, the production of national inventories and the development of databases, as well as the gathering of new data through research and monitoring as a part of a dynamic process. Such an undertaking will also provide the baseline against which the efforts of nations to implement relevant provisions of Agenda 21 and the Convention on Biological Diversity can be measured, and will enhance the monitoring and assessment capability of countries and the development of indicators for sustainable development. The acquisition, organization and analysis of information as a tool for decision-making must be issue-based and guided by specific objectives.

23. Perhaps most important in the area of data and information is the steadily increasing pace of the preparation of biodiversity country assessments, strategies and action plans. The primary objective of the country studies programme initiated by UNEP is to assist national Governments to identify, in the light of social, economic, environmental and other objectives, the basic needs and levels of effective conservation, including the rational use of national biological resources and the necessary supportive measures and costs to meet those needs, as well as the benefits associated with the implementation of those measures. The country studies are also expected to (a) provide an overview of the status of biological diversity, in terms of present knowledge, conservation efforts and future conservation needs and costs; (b) institutionalize national biodiversity conservation strategies and action plans to be carried out in concert with national, regional and international institutions, and within the framework of Agenda 21 and the Convention on Biological Diversity; (c) provide a basis for establishing priority areas of biological diversity conservation, and for national environmental planning and resource use; (d) identify or develop techniques and methodologies for estimating the costs and benefits of the conservation of biological diversity; (e) enhance the national capacity to assess the direct and indirect benefits, investment costs and basic funding needs of biodiversity conservation and its rational use; (f) develop understanding among decision makers, educators, economists, social scientists and the general public of the importance of safeguarding biological diversity, and engage their support in this area; and (g) secure additional parties to the Convention on Biological Diversity, and promote the effective implementation of other biodiversity-related international and regional agreements and action plans.

24. As a major contribution to mobilizing the scientific community to help provide a solid basis for further decision-making and follow-up to the Convention on Biological Diversity and Agenda 21, UNEP initiated the Global Biodiversity Assessment, with funding from GEF, with the aim of providing an independent, critical, peer-reviewed scientific analysis of the current issues, theories and views regarding the main global aspects of biodiversity. The assessment will serve as a basis for decision-making to meet the objectives of the Convention on Biological Diversity and Agenda 21; it will also be an important tool for the scientific body of the Convention. The potential audience of the Assessment is large and includes international, regional and national environmental organizations, both governmental and non-governmental, as well as policy makers and scientists working in the field of biodiversity. The main text of the Assessment and a policy maker's summary is expected to be ready by the second half of 1995.

25. To improve the availability of reliable up-to-date information to support biodiversity planning and management in developing countries, UNEP, with support from GEF, launched a project to assist developing countries and the economies in transition in building their information capabilities and in transferring appropriate technologies and skills in information management to organize, maintain and use data generated under the country studies process.

26. The interim secretariat of the Convention on Biological Diversity is compiling a list of databases of relevance to the Convention, identifying their gaps and linkages. A catalogue will be prepared, updated regularly and widely

distributed. A similar activity was initiated to compile information on scientific programmes and international cooperation.

27. In addition, FAO in collaboration with UNEP supported the establishment of global and regional data banks on livestock and poultry genetic resources; a coastal resource atlas was produced using GIS as a management tool for coastal regions (UNEP); the establishment of the Global Biodiversity Information Network (BIN21) was initiated (UNEP/Tropical Database, Brazil); and the first edition of the World Watch List for Domestic Animal Diversity and four volumes of the bulletin Animal Genetic Resources Information were released (FAO/UNEP).

28. UNESCO is developing its own electronic network and information service on biosphere reserves and ecological sciences (MABNet), as well as its own database on national and cultural world heritage sites.

29. WCMC continued to compile and update substantial databases on habitats and threatened animals and plants for the red data books and biodiversity status reports that it publishes. WMO, through its Agricultural Meteorology Programme, assists its members in improving their capabilities in the application of meteorological and climatological information to agricultural production (food, forestry and fisheries), and thus contributes to the conservation and use of biodiversity, especially in marginal and severe climatic conditions.

30. WMO, jointly with FAO and recently with UNEP, organized practical on-the-spot training using mini or hand-held computers on the application of agro-meteorological data and information for effective planning and management of water for sustainable irrigated crop production. WMO also organized jointly with EPPO and NAPPO symposia and workshops to give practical training in the use of meteorological data in the fight against pest and diseases, in reducing the level of undesired chemicals and in improving the quality of agricultural produce. Activities to counter locust swarms have been expanded to include case studies on the successful use of meteorological data in desert locust control. Efforts are being made to create monitoring operations through the acquisition and installation of equipment for meteorological observations, including remote sensing and collaboration with PRIFAs. A publication on the application of agro-meteorological information for desert locusts control has been issued. WMO has also been participating in a number of activities to promote the use of meteorological and hydrological information to protect forests and desert-land ecosystems and thus contribute to the conservation of biodiversity.

31. Drought and desertification are serious threats to many species, especially in dry and semi-arid areas. As a contribution to the conservation of these threatened species, WMO, in collaboration with UNEP, prepared a comprehensive report entitled "Interactions of desertification and climate", which was one of the many inputs made by WMO to the negotiating process of the Convention on Biological Diversity. The report is being published as a joint WMO/UNEP publication.

32. WMO, in cooperation with the University of Nebraska, held training seminars on drought analyses and on drought assessment, preparedness and management in Africa and Latin America.

3. International and regional cooperation and coordination

33. If the world's biodiversity is to be monitored, conserved and used in a sustainable way, international and regional cooperation as a means of linking and sharing experience and information is essential. This was envisaged in chapter 15 of Agenda 21, which calls for the promotion of cooperation between the parties to relevant international conventions and action plans with the aim of strengthening and coordinating efforts to conserve biodiversity and the sustainable use of biological resources (para. 15.7 (e)), as well as the promotion of improved international coordination of measures for conserving and managing endangered/non-pest migratory species (para. 15.7 (g)). A number of programmes are under way, as follows:

(a) A number of relevant global networks are being established/ strengthened for enhancing global access to biodiversity information, including the Biodiversity Information Network (BIN21), MSDN, BINAS and IRRO;

(b) The Convention on Biological Diversity is expected to support the establishment or strengthening of networks for technical and scientific cooperation, and capacity-building for the implementation of the provisions of the Convention.

34. Within the biodiversity country studies framework, countries are being assisted in the development of baseline surveys and inventories of national biodiversity (UNEP), the development of economic tools to determine costs, and benefits of biodiversity conservation and their distribution (UNEP).

35. FAO, UNEP, UNESCO, IPGRI and others support regional and global programmes for the surveying, collection, evaluation and conservation of animal, plant and microbial genetic resources, and training in relevant fields.

36. The following systems and programmes are already operational: global networks of gene banks housing the world base collection of crop genetic resources (CGIAR/IPGRI/FAO); regional MIRCENs (UNEP, UNESCO); UNESCO-MAB/GEF protected areas network for biodiversity conservation in central Europe; the Northern Sciences Network (UNESCO-MAB); Global Ocean Ecosystem Dynamics (UNESCO); the South-South Cooperation Programme for the Conservation of Tropical Ecosystems (UNESCO/UNU); the China Biosphere Reserves Network (UNESCO-MAB); marine laboratory networks (UNESCO); and the international environmental education programme (UNEP/UNESCO).

37. The Environmental Action Programme for Central and Eastern European Countries was adopted by the European Ministers of the Environment (Lucerne, Switzerland, 1993); the Programme includes a chapter on the conservation of biological diversity.

38. The Second Ministerial Conference on the Protection of Forests in Europe (Helsinki, 1993) adopted guidelines for the conservation of the biodiversity of European forests.

39. Following the adoption of resolution 2 at the Ministerial Conference for the Protection of Forests in Europe (Strasbourg, France, 1990) and its

endorsement at the Second Ministerial Conference (Helsinki, 1993), IPGRI and FAO have jointly developed the European Forest Genetic Resources Programme (EUFORGEN).

40. CGIAR, which has traditionally focused on crop genetic resources, decided in 1991 to expand its mandate to include forestry and agro-forestry. As part of this resource, the Centre for International Forestry Research (CIPOR), based in Bogor, Indonesia, focuses on natural ecosystems and their management, as well as plantations; the International Centre for Research in Agro-Forestry (ICRAF), based in Nairobi, looks at the role of agro-forestry and specifically at the adoption of multipurpose trees in sustainable farming systems; and the International Plant Genetic Resources Institute (IPGRI), based in Rome, concentrates on the conservation and utilization of the genetic resources of agricultural crops and forest tree species.

41. The Council of Europe Convention on the Conservation of European Wildlife and Natural Habitats was adopted in Bern, Switzerland, on 19 September 1979 and entered into force in 1982. The European Union Habitat Directive on the Conservation of Natural Habitats and Wild Fauna and Flora entered into force in 1994.

42. The Lucerne Declaration of 30 April 1993 adopted by the Second Pan-European Ministerial Conference on the theme "Environment for Europe" contains a section on the conservation of biodiversity. The Maastricht Declaration of 12 November 1993 of the Conference, entitled "Conserving Europe's natural heritage: towards a European ecological network", considers the development of a European biological and landscape diversity strategy.

43. The Monaco Declaration, entitled "The Role of the Bern Convention in the Implementation of Worldwide International Instruments for the Protection of Biodiversity", was adopted on 28 September 1994 by the Intergovernmental Symposium on the theme "UNCED, the Convention on Biological Diversity and the Bern Convention: the next steps". The participants acknowledged that regional international organizations should act to favour the application of world wide international instruments for the protection of biodiversity, in particular the Convention on Biological Diversity, the Rio Declaration on Environment and Development, the Non-legally Binding Authoritative Statement of Principles Global Consensus on the Management, Conservation and Sustainable Development of All Types of Forests, and Agenda 21. They also acknowledged that the Council of Europe has a fundamental role to play in the implementation at the regional level of principles and obligations adopted on a global level, and that the Bern Convention constitutes an instrument of major importance for the conservation of biological diversity at the regional level by reasons of its objectives and its geographical coverage. Several recommendations on the scientific, technical, strategic and financial aspects of the question were adopted within this framework by the participants.

44. The following regional meetings were organized with UNEP support to promote the implementation of the Convention on Biological Diversity: the ASEAN countries' Conference on the Convention on Biological Diversity and the Bangalore Declaration (1994); the African Ministerial Conference on the Convention on Biological Diversity (1994); the Baltic States Meeting on the

Convention on Biological Diversity (1994); and workshops on the Convention on Biological Diversity in Latin America and the Caribbean (1994).

45. The following activities are under way: the production of an eastern African coastal and marine environment database and atlas (UNEP); the protection of East African Biodiversity (FAO/UNEP); the creation of global terrestrial observing systems (FAO, ICSU, UNEP, UNESCO, WMO); the conservation of critical coral reef habitats in the Red Sea (UNEP-GEF); the creation of a regional activity centre for the protection of biodiversity/Black Sea action plan (UNEP-GEF); and the protection of the marine biodiversity of the Caspian Sea (UNEP-GEF).

46. Action plans for the management of the Mediterranean Monk Seal and the conservation of Mediterranean cetaceans and marine turtles have been initiated by UNEP.